

**Virtuox HoST**  
**ARES Sleep Study Report**

<b>Patient Name</b>	Test Patient	<b>Study Ordered by</b>	Jimbo Fisher
<b>Date of Night 1</b>	11/01/2010	<b>Date of Birth</b>	8/27/1971
<b>Date of Night 2</b>	11/02/2010	<b>Identification Number</b>	

Overall AHI	Overall RDI	% time < 90% SpO2	Mean SpO2	% time snoring > 30 dB
101	110	45.0 %	90.6 %	37.2 %

**PHYSICIAN INTERPRETATION AND COMMENTS:** Findings are consistent with very severe, non-positional obstructive sleep apnea (OSA).

**CLINICAL HISTORY:** 39 year old male presented with: 17.5 inch neck, BMI of 31, an Epworth sleepiness score of 19, history of hypertension and symptoms of nocturnal snoring, waking up choking and witnessed apneas. Based on the clinical history, the patient has a high pre-test probability of having severe OSA.

**SLEEP STUDY FINDINGS:** Patient underwent a two night in-home sleep study and by behavioral criteria, slept for approximately **12** hours, with a sleep efficiency of 87.5%. **Very severe** sleep disordered breathing (**AHI=101**) is noted based on a 4% hypopnea desaturation criteria. The patient slept supine 92.0% of the night based on valid sleep time of 10.6 hours and is 1.7 times as likely to have apneas/hypopneas when supine. The apneas/hypopneas are accompanied by severe oxygen desaturation (percent time below 90% SpO2: 45.0%, Min SpO2: 74.8%). The average desaturation across all sleep disordered breathing events is 6.6%. A total sleep time across all nights with valid SpO2 <= 89% was 231.3 minutes (average 115.7 min/night) and 187 minutes with valid SpO2 <= 88% (average 93.5 min/night). **Snoring** occurs for **37.2%** (30 dB) of the study, 20.3% is extremely loud. The mean pulse rate is 71 BPM, with very frequent pulse rate variability (148 events with >= 6 BPM increase/decrease per hour).

**TREATMENT CONSIDERATIONS:** Consider nasal continuous positive airway pressure (CPAP) as the initial treatment choice for very severe obstructive sleep apnea. Consider a facility based study given the severity of the apnea. An auto-PAP or an auto-PAP titration study may be appropriate given the ARES predicted CPAP pressure of 12 cm H2O. If the patient fails CPAP therapy, begin supplemental oxygen. A mandibular advancement splint (MAS) or referral to an ENT surgeon for modification to the airway should be considered to reduce the risk of mortality caused by very severe OSA if the patient prefers an alternative therapy or the CPAP trial is unsuccessful. A follow up sleep study using the MAS or following surgery is recommended.

**DISEASE MANAGEMENT CONSIDERATIONS:** Perioperative complications are more likely during surgery or recovery as a result of general anesthesia, sedatives and/or narcotic pain relief medication in a patient with significant untreated OSA. Routine follow-up efficacy testing should be performed when non-CPAP therapies are prescribed since weight gain, age, alcohol consumption, and/or time spent sleeping supine can increase OSA severity.

Signature: 

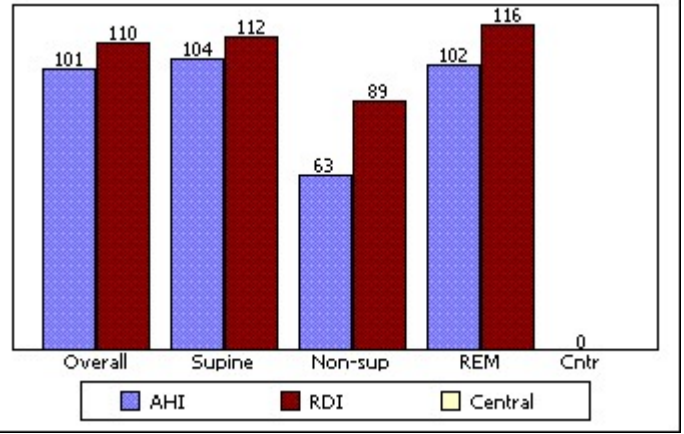
Date: 11/09/2010

**Study Review:** The raw data of this ARES study have been reviewed and the report confirmed by James Krainson Diplomat in Sleep Medicine by ABSM and ABMS.. **Caution:** The diagnosis of the Obstructive Sleep Apnea Syndrome must be based on all available clinical data, of which this study is only a part. Thus final diagnosis and treatment recommendations should include information from an examination of the patient by a knowledgeable physician.

**ARES Traceability:** 2010110922531\_bb7ef6fc-2fec-df11-baea-005056b80e76\_N1.ASI; 2010110922531\_bb7ef6fc-2fec-df11-baea-005056b80e76\_N2.ASI;

# ARES Sleep Study Report

Patient Name		Test Patient	
Age	39	Gender	Male
Height (in)	74	BMI	31
Weight (lbs)	240	Neck Size (in)	17.5
OSA Risk	High Risk	Pred. Severity	Severe
HBP	Yes	Heart Disease	No
Diabetes	No	Depression	No
Stroke	No	Epworth	19
Snoring Frequency		Almost always	
Gasping or Choking		Frequently	
Observed to stop breathing during sleep		Almost always	

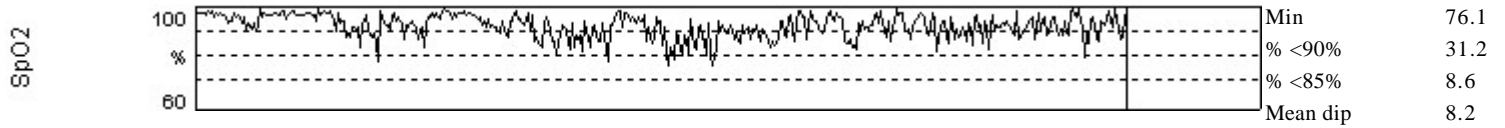


**Study Date:** 11/01/2010

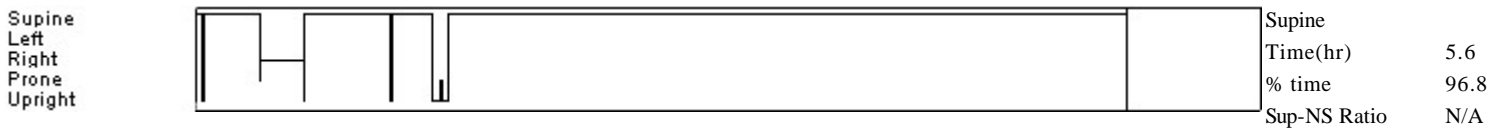
### Sleep Disordered Breathing events



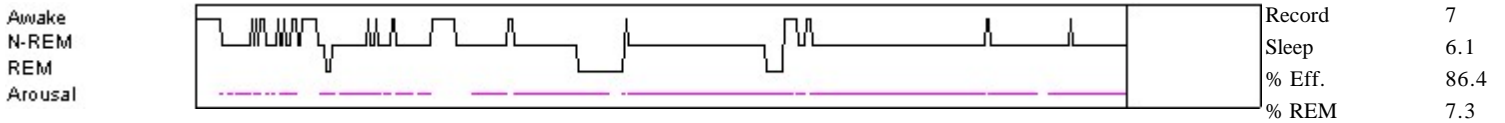
### Oxygen Saturation



### Head Position



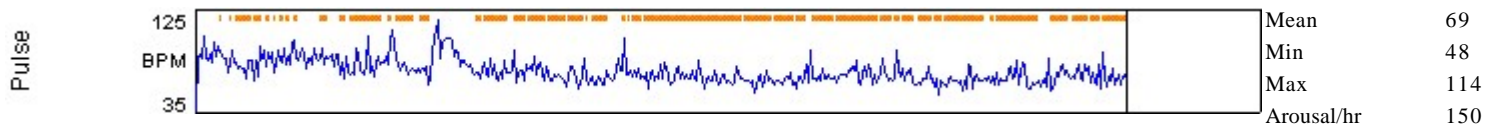
### Awake / Sleep by actigraphy



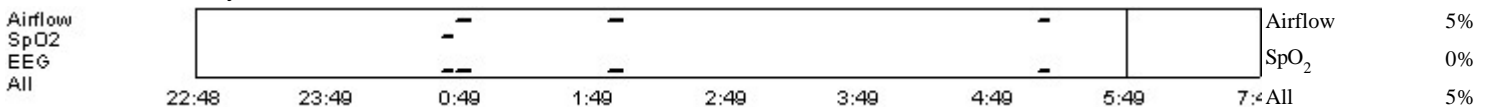
### Snoring with arousal indications



### Pulse Rate with arousal indicators



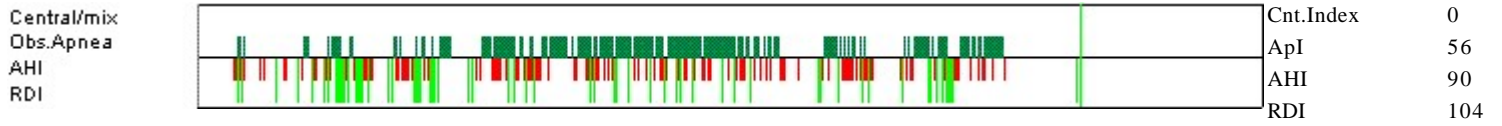
### Excluded from analysis



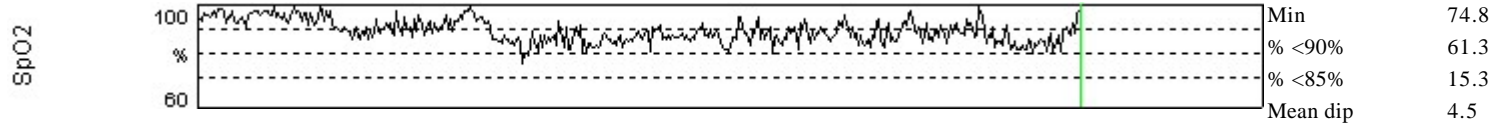
Patient Name	Test Patient	Age	39	Gender	Male
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**Study Date:** 11/02/2010

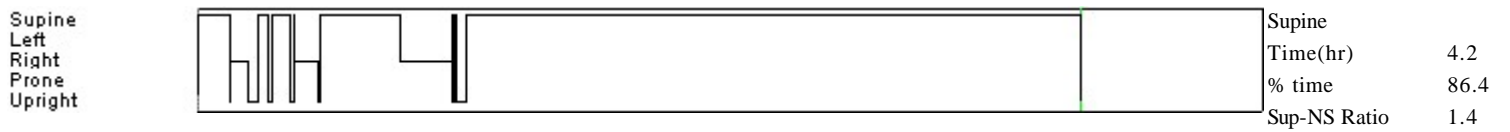
**Sleep Disordered Breathing events**



**Oxygen Saturation**



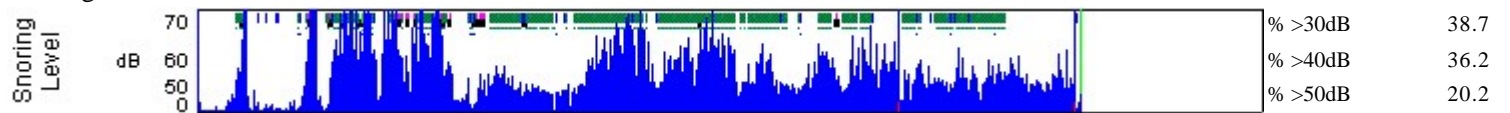
**Head Position**



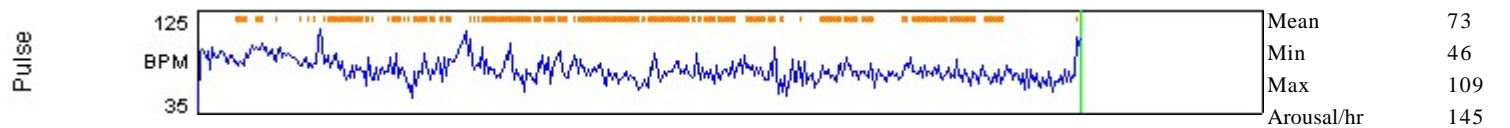
**Awake / Sleep by actigraphy**



**Snoring with arousal indications**



**Pulse Rate with arousal indicators**



**Excluded from analysis**



# Virtuox HoST

## ARES Sleep Study Multi-Night Comparison Report

<b>Patient Name</b>	Test Patient	<b>Study Ordered by</b>	Jimbo Fisher
<b>Date of Night 1</b>	11/01/2010	<b>Date of Birth</b>	8/27/1971
<b>Date of Night 2</b>	11/02/2010	<b>Identification Number</b>	

### COMPARISON FINDINGS

	<b>Night One</b>	<b>Night Two</b>
Total Recording Time (Hours)	7	6.6
Total Sleep Time (Hours)	6.1	5.9
Sleep Efficiency	86.4 %	88.9 %
Initial Sleep Latency (Minutes)	11	17
Valid Sleep Time (Hours)	5.8	4.9
Overall Apnea Index	49	56
Overall AHI - 4% Desat	111	90
Overall AHI - 1% Desat	116	104
% Time - Supine	96.8 %	86.4 %
Hours - Supine	5.6	4.2
Supine Apnea Index	50	59
Supine AHI - 4% Desat	113	93
Supine AHI - 1% Desat	117	106
% Time - Non-Supine	3.2 %	13.6 %
Hours - Non-Supine	0.2	0.7
Non-Supine Apnea Index	5	38
Non-Supine AHI - 4% Desat	44	68
Non-Supine AHI - 1% Desat	87	89
% Sleep Time - REM	7.3 %	13.8 %
Hours - REM	0.4	0.7
REM Apnea Index	64	55
REM AHI - 4% Desat	124	89
REM AHI - 1% Desat	128	108
<b>Oxyhemoglobin Saturation (SpO<sub>2</sub>) Data</b>		
Baseline SpO <sub>2</sub> (start of recording)	97.4	96.9
Mean SpO <sub>2</sub> at Start of Desaturation Events	95.3	91.1
Mean Nadir for Desaturation Events	87.1	86.6
Mean SpO <sub>2</sub> Dip from Desaturation Events	8.2	4.5
% Time SpO <sub>2</sub> Below 95%	69.5	90.1
% Time SpO <sub>2</sub> Below 90%	31.2	61.3
% Time SpO <sub>2</sub> Below 85%	8.6	15.3
<b>Percent (%) Time Snoring</b>		
> 30dB = quiet whisper	35.8	38.7
> 40dB = normal conversation	34.6	36.2
> 50dB = loud singing	20.3	20.2
<b>Pulse Rate</b>		
Mean +/- 1 S.D.	69 +/- 8.8	73 +/- 7.9
Max/Min	99 / 52	97 / 55
Pulse Rate Arousal Index (PRAI) – events/hr	150	145
PRAI – during A/H events	98	86
<b>Technical Factors</b>		
% time with poor quality airflow	4.2	15.4
% time with poor quality SpO <sub>2</sub>	6.0	10.6